

CLAIMS

1. A filament or fibre, comprising:
an elongate core having a core axis;
5 a substance having at least one electrically modulatable optical characteristic, covering at least a portion of the core; and
an electrical stimulation means adapted to produce an electric field extending in a direction substantially parallel to the core axis or in a direction extending substantially circumferentially about the core axis, wherein the
10 electric field electrically induces a change in the optical characteristic of the substance, thereby changing the visual appearance of the filament or fibre.
2. The filament or fibre of claim 1, wherein the elongate core is formed from electrically insulating material.
- 15 3. The filament or fibre of claim 1 or claim 2, wherein the elongate core is substantially cylindrical.
4. The fibre or filament of any preceding claim, wherein the
20 stimulation means comprises an elongate stimulation layer extending in a direction substantially parallel to the core axis, the stimulation layer being substantially coaxial with the core.
5. The fibre or filament of any preceding claim, comprising a
25 plurality of elongate stimulation layers, each extending in a direction substantially parallel to the core axis, and each being substantially coaxial with the core, each layer being spaced apart from the core axis by a separation radius that is different from the separation radius of at least some of the other layers.
- 30 6. The fibre or filament of claim 4 or claim 5, wherein the stimulation means further comprises one or more substance layers each extending in a

direction substantially parallel to the core axis, the substance layers being substantially coaxial with the core and each associated with at least one stimulation layer.

5 7. The filament or fibre of claim 6, wherein the substance layers extend substantially along the entire length of the core.

8. The filament or fibre of any of the claims 4 to 7, wherein each stimulation layer includes at least one electrode array.

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9. The filament or fibre of any of claims 4 to 8, wherein each stimulation layer includes a plurality of electrode arrays.

15 10. The filament or fibre of claim 8 or claim 9, wherein each electrode array is adapted to produce an electric field substantially within a stimulation layer, the electric field extending along a direction substantially parallel to the core axis or in a direction extending substantially circumferentially about the core axis.

20 11. The filament or fibre of any of claims 8 to 10, wherein each electrode array is associated with at least a portion of the substance.

25 12. The filament or fibre of claim 11, wherein the electric field is adapted to electrically induce a change in the optical characteristic of the portion of the substance.

13. The filament or fibre of any of claims 8 to 12, wherein the core is in contact with a stimulation layer.

30 14. The filament or fibre of claim 13, wherein the stimulation layer is sandwiched between the core and at least one substance layer.

15. The filament or fibre of claim 13 or claim 14, wherein each electrode array extends circumferentially and axially along at least a portion of an outer surface of the core.

5 16. The filament or fibre of claim 15, wherein each electrode array is adapted to produce an electric field extending substantially along the portion of the outer surface of the core in a direction substantially parallel to the core axis or in a direction substantially circumferentially about the core axis.

10 17. A filament or fibre, comprising:
an elongate core having a core axis;
a substance having at least one electrically modulatable optical characteristic, covering at least a portion of the core; and

15 an electrical stimulation means comprising a first and a second electrode pair adapted to produce an electric field extending in a direction substantially parallel to the core axis or in a direction extending substantially transversely to the core axis, wherein the first and second electrodes are disposed in the same off-axis plane, and wherein the electric field electrically induces a change in the optical characteristic of the substance, thereby
20 changing the visual appearance of the filament or fibre.

18. The filament or fibre of claim 17, wherein the electrical stimulation means further comprises a plurality of electrode pairs in the form of an electrode array, the electrode array disposed in the same off-axis plane.

25 19. The filament or fibre of claim 18, wherein the electrical stimulation means further comprises a plurality of co-planar electrode arrays.

20. The filament or fibre of any of claims 8 to 16 or claim 19, wherein
30 each electrode array is electrically independent.

21. The filament or fibre of any of claims 8 to 16 or claim 19 or claim 20, wherein each electrode array includes segmented electrodes.

22. The filament or fibre of claim 21, wherein at least one electrode is adapted to be individually addressed.

23. The filament or fibre of any of claims 8 to 16 or claims 18 to 22, wherein the electrodes in an array have different predetermined spacings and/or different predetermined lengths, so as to produce variations in the electric field in the filament or fibre.

24. The filament or fibre of any of claims 8 to 16 or claims 18 to 23, wherein the electrodes are interdigitated electrodes.

25. The filament or fibre of any of the preceding claims, further comprising one or more sheaths substantially coaxial with the core.

26. The filament or fibre of claim 25, wherein the one or more sheaths are at least partially transparent.

27. The filament or fibre of claim 25 or claim 26, wherein the one or more sheaths are formed from a non-conductive flexible polymer.

28. The filament or fibre of any of the preceding claims, further comprising spacer means.

29. The filament or fibre of claim 28, wherein the spacer means comprises one or more spacer wires extending in a direction substantially parallel to the core axis.

30. The filament or fibre of claim 28, wherein the spacer means comprises a plurality of substantially spherical beads.

31. The filament or fibre of claim 30, wherein the substantially spherical beads are contained within the substance.

5 32. The filament or fibre of any of claims 28 to 31, wherein the spacer means are formed from electrically insulating material.

33. The filament or fibre of any preceding claim, wherein the electrically modulatable substance is an inorganic or organic electro-
10 luminescent material or a liquid crystal material.

34. The filament or fibre of any preceding claim, wherein the core is made from a flexible polymer fibre.

15 35. The filament or fibre of claim 31, wherein the polymer fibre can be selected from any one of the following: polyester, polyamide, acrylic, polypropylene, vinyl-based polymers, wool, silk, flax, hemp, linen, jute, rayon, cellulose acetate and cotton.

20 36. The filament or fibre of any preceding claim, wherein the optical characteristic of the substance is the colour.

37. A garment formed from a plurality of filaments or fibres according to any one of the preceding claims.

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38. A textile formed from a plurality of filaments or fibres according to any one of the preceding claims.